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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/868,716	06/20/2001	Jurgen Beyerer	34691/234885	3478
826	7590	10/29/2004	EXAMINER	
ALSTON & BIRD LLP BANK OF AMERICA PLAZA 101 SOUTH TRYON STREET, SUITE 4000 CHARLOTTE, NC 28280-4000			YAM, STEPHEN K	
			ART UNIT	PAPER NUMBER
			2878	

DATE MAILED: 10/29/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/868,716

Applicant(s)

BEYERER ET AL.

Examiner

Stephen Yam

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 04 June 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 30-34, 36-40, 42 and 45-47 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 30-34, 36-40, 42 and 45-47 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Arguments

1. In view of the appeal brief filed on August 4, 2004, PROSECUTION IS HEREBY REOPENED. New grounds of rejection are set forth below.

To avoid abandonment of the application, appellant must exercise one of the following two options:

(1) file a reply under 37 CFR 1.111 (if this Office action is non-final) or a reply under 37 CFR 1.113 (if this Office action is final); or,

(2) request reinstatement of the appeal.

If reinstatement of the appeal is requested, such request must be accompanied by a supplemental appeal brief, but no new amendments, affidavits (37 CFR 1.130, 1.131 or 1.132) or other evidence are permitted. See 37 CFR 1.193(b)(2).

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 30-34, 37, and 42 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bartulovic et al. US Patent No. 6,177,682 in view of Pöhlandt US Patent No. 5,996,681.

Regarding Claims 30, 31, 33, 34, 37, and 42, Bartulovic et al. teach (see Fig. 5) a method of detecting defects on an object, comprising illuminating (with (41'-41''')) each object by at

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least two light sources from different directions and so as to produce shadows (31'-31''') which magnify an area of each object (since the light sources are point light sources (see Col. 5, lines 44-47), any shadow formed from an object is inherently larger than the object itself), recording with a camera (49) arranged at a fixed location (having the field of view of the camera is at least the size of the object- see Fig. 1 and Col. 4, lines 24-34), each illuminated object and the magnifying shadows resulting from the illumination to produce recorded data having a recorded image (see Col. 3, lines 38-41 and Col. 8, lines 4-6), and processing (see Col. 3, lines 42-45) the recorded data in a computer (83) (see Fig. 1), and including processing the recorded image by comparing the recorded image with a record of reference data (see Col. 3, lines 49-57 and Col. 4, lines 17-23), exchanging signals between the computer and a stored program control (see Col. 3, lines 44-46), and a further step of performing a qualitative or quantitative image evaluation on the recorded image (see Col. 3, lines 49-51), the recording step recording at least two images which are processed in the processing step (see Col. 8, lines 4-6), the image processing step comprising a defect detection (detection of the object to within "acceptable tolerances"- see Col. 4, lines 17-23). Bartulovic et al. also teach the invention applied towards any structure having regularly formed objects (see Col. 11, lines 56-62). Bartulovic et al. do not teach the objects as shot cores or core packets used in the foundry industry. Pöhlandt teaches (see Fig. 1) a method for detecting defects in a shot core (3) or core packet in the foundry industry by capturing (5) and analyzing (6) an image. It would have been obvious to one of ordinary skill in the art at the time the invention was made to detect defects in a shot core or core packet as taught by Pöhlandt in the method of Bartulovic et al., to provide non-contacting defect detection and scanning for quality control in shot cores/core packets, as taught by Pöhlandt (see Col. 4, lines 65-67).

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Regarding Claim 32, Bartulovic et al. in view of Pöhlandt teach the method in Claim 30, according to the appropriate paragraph above. Bartulovic et al. do not teach the camera including a lens and the camera encased at least in the region of the lens. It is well known in the art that a camera includes a lens to properly focus an image onto an internal imaging element and is encased to protect the imaging element from receiving external light. It would have been obvious to one of ordinary skill in the art at the time the invention was made to include a lens in the camera and to encase the camera at least in the region of the lens in the method of Bartulovic et al. in view of Pöhlandt, to properly receive images on the camera and prevent external light from adversely affecting the imaging on the camera.

4. Claim 36 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bartulovic et al. in view of Pöhlandt as applied to Claim 30, further in view of Sacks et al. US Patent No. 4,736,437.

Bartulovic et al. in view of Pöhlandt teach the method in Claim 30, according to the appropriate paragraph above. Bartulovic et al. do not teach the comparing step including a coarse correlation with the recording data. Sacks et al. teach an image processing method with processing a recorded image from recorded data and comparing it with a record of reference data (see Col. 1, lines 9-13 and Col. 2, lines 60-63), wherein the comparing includes a coarse correlation with the recording data (see Col. 1, lines 43-56 and Col. 4, lines 30-35). It would have been obvious to one of ordinary skill in the art at the time the invention was made to include a coarse correlation with the recording data as taught by Sacks et al. in the method of

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Bartulovic et al. in view of Pöhlandt, to reduce processing time and provide a high-speed and accurate comparison as taught by Sacks et al. (see Col. 1, lines 9-13 and 21-25).

5. Claims 38-40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bartulovic et al. in view of Pöhlandt, further in view of Sentoku et al. US Patent No. 6,529,625.

Regarding Claims 38-40, Bartulovic et al. in view of Pöhlandt teach the method in Claim 37, according to the appropriate paragraph above. Bartulovic et al. also teach (see Fig. 5) the objects located on a base (19). Bartulovic et al. do not the image processing step including a position correction by recording line and/or dot reference marks on a base. Sentoku et al. teach (see Fig. 1) a method of positioning an object (elements within (2)) with an optical detection system (13) (see Col. 6, lines 23-30), with a position correction by recording line reference marks (4) (see Fig. 1 and 2B) on a base (2). It would have been obvious to one of ordinary skill in the art at the time the invention was made to provide position correction including recording line and/or dot reference marks on a base, as taught by Sentoku et al., in the method of Bartulovic et al. in view of Pöhlandt, to ensure alignment and positioning of the object relative to the detection system for accurate measurements and analysis.

6. Claims 45 and 46 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bartulovic et al. in view of Pöhlandt, further in view of Radl et al. US Patent No. 4,782,238.

Regarding Claim 45, Bartulovic et al. in view of Pöhlandt teach the method in Claim 30, according to the appropriate paragraph above. Bartulovic et al. do not teach the processing step further including a brightness adjustment for adapting the gray-scale values of the image. Radl

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et al. teach a similar method of using shadows for object detection, with a processing step (see Fig. 8) including a brightness adjustment (52) for adapting the gray-scale values of the image (see Col. 7, lines 39-44). It would have been obvious to one of ordinary skill in the art at the time the invention was made to operate the at least two light sources in sequence as taught by Radl et al. in the method of Bartulovic et al. in view of Pöhlandt, to provide increased contrast for improved edge detection and reduce false detection readings.

Regarding Claim 46, Bartulovic et al. in view of Pöhlandt teach the method in Claim 30, according to the appropriate paragraph above. Bartulovic et al. do not teach the at least two light sources operated in sequence. Radl et al. teach a similar method of using shadows for object detection, wherein at least two light sources are operated in sequence (see Fig. 4A, 4B, 5A, 5B and Col. 4, lines 45-54). It would have been obvious to one of ordinary skill in the art at the time the invention was made to operate the at least two light sources in sequence as taught by Radl et al. in the method of Bartulovic et al. in view of Pöhlandt, to provide distinctive shadows by each light source, to enhance detection contrast for detecting separate sides of the object.

7. Claim 47 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bartulovic et al. in view of Pöhlandt, further in view of Raviv US Patent No. 4,873,651.

Regarding Claim 47, Tabatabaei in view of Pöhlandt teach the method in Claim 30, according to the appropriate paragraph above. Tabatabaei and Pöhlandt do not teach the at least two light sources operated with color differentiation. Raviv teaches (see Fig. 1B) a method for imaging the surface of an object (1) comprising illuminating the object by at least two light sources (6) from different directions so as to produce shadows (see Fig. 1A and Col. 2, lines 40-

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52), recording by means of a camera (3) each object and the shadows resulting from the illumination to produce recorded data which comprise a recorded image (see Col. 5, lines 56-58 and Col. 6, lines 4-7), and processing the recorded data in a computer (4), wherein the at least two light sources are operated with color differentiation (see Col. 8, lines 33-37). It would have been obvious to one of ordinary skill in the art at the time the invention was made to operate the two light sources with color differentiation as taught by Raviv in the method of Bartulovic et al. in view of Pöhlandt, to obtain and record multiple shadow projections simultaneously, as taught by Raviv (see Col. 8, lines 33-37).

Response to Arguments

8. Applicant's arguments with respect to claims 30-34, 36-40, 42, and 45-47 have been considered but are moot in view of the new ground(s) of rejection.

Regarding Applicant's arguments on Claim 47, Applicant argues that the invention of Raviv is non-analogous, as it relates to the imaging of an object to facilitate gripping of the object by a robot. Examiner asserts that although the final operation of the invention may be variant from the uses of the Tabatabaei (or Bartulovic in the present Office Action) and Pöhlandt, the imaging and detection system of Raviv pertains to the same art as Tabatabaei and Bartulovic, as the inventions of Raviv, Tabatabaei, and Bartulovic all capture and analyze an image according to the shadow for dimensional measurements. Therefore, the modifications or improvements from the detection system of Raviv are properly applied to the detection systems of Tabatabaei and Bartulovic. Furthermore, Bartulovic et al. also teach the invention applied towards any structure having regularly formed objects (see Col. 11, lines 56-62), therefore,

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applying it towards the detection/inspection of shot core or core packets would have been obvious to one of ordinary skill in the art.

Conclusion

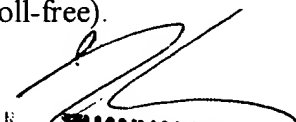
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Stephen Yam whose telephone number is (571)272-2449. The examiner can normally be reached on Monday-Friday 8:30am-5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Porta can be reached on (571)272-2444. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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THANH X. LUU
PATENT EXAMINER